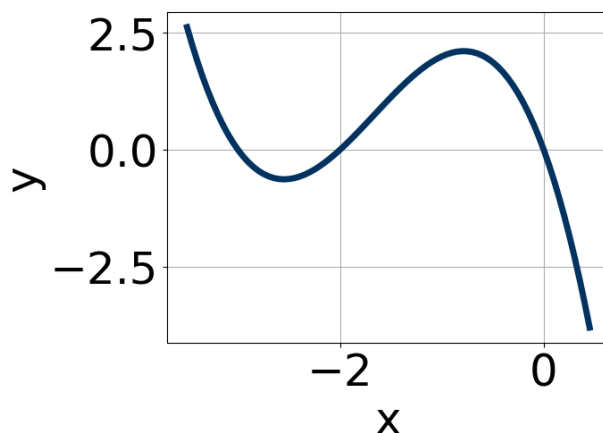1. Which of the following equations *could* be of the graph presented below?

    A. $-19x^{11}(x+2)^9(x+3)^9$

    B. $8x^7(x+2)^{11}(x+3)^9$

    C. $-2x^9(x+2)^{10}(x+3)^8$

    D. $-19x^5(x+2)^8(x+3)^9$

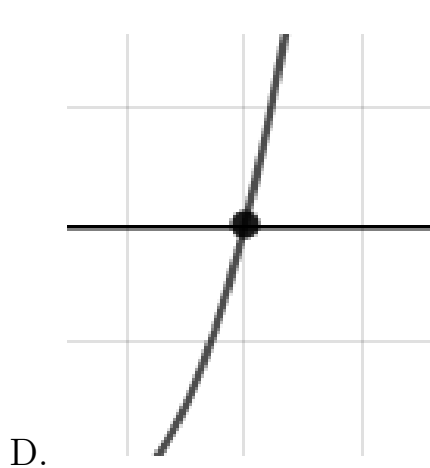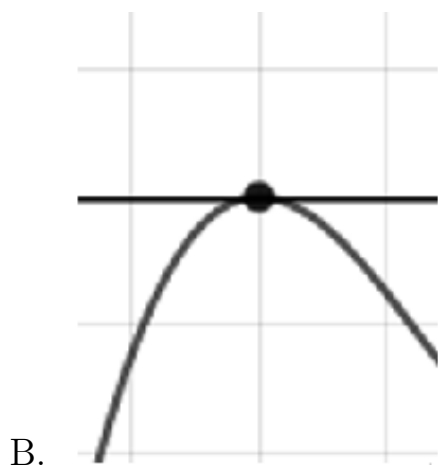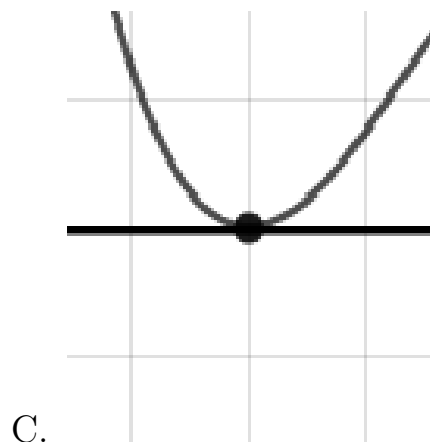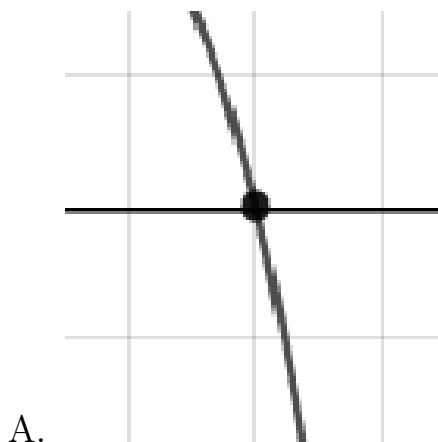   E. $15x^9(x+2)^6(x+3)^7$

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2. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{2}, -7, \text{ and } \frac{7}{2}$$

    A. $a \in [1,7], b \in [20,23], c \in [-77,-71], \text{ and } d \in [-149,-143]$

    B. $a \in [1,7], b \in [-20,-13], c \in [-77,-71], \text{ and } d \in [147,150]$

    C. $a \in [1,7], b \in [6,15], c \in [-120,-118], \text{ and } d \in [147,150]$

    D. $a \in [1,7], b \in [20,23], c \in [-77,-71], \text{ and } d \in [147,150]$

    E. $a \in [1,7], b \in [-52,-47], c \in [158,164], \text{ and } d \in [-149,-143]$

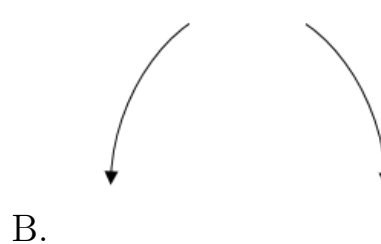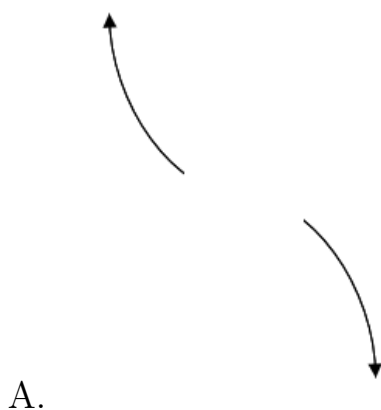3. Describe the zero behavior of the zero $x = -7$ of the polynomial below.

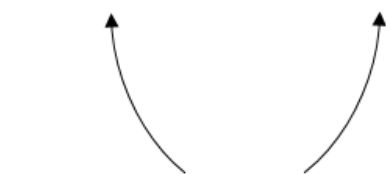$$f(x) = -2(x-4)^8(x+4)^5(x+7)^{10}(x-7)^9$$
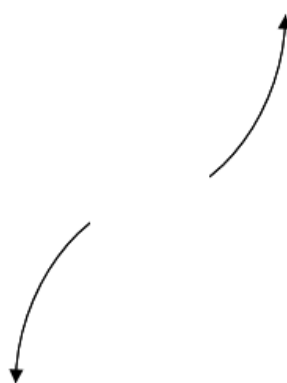
A.

C.

B.

D.

E. None of the above.

4. Describe the end behavior of the polynomial below.
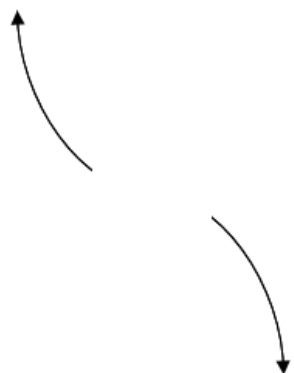
$$f(x) = 7(x-7)^2(x+7)^3(x-8)^5(x+8)^5$$

B.

A.

C.

D.

E. None of the above.
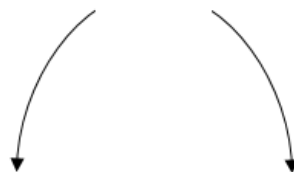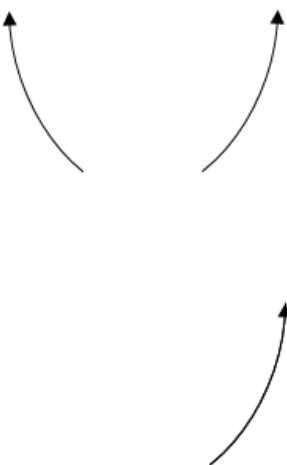
5. Describe the end behavior of the polynomial below.

$$f(x) = 2(x-2)^4(x+2)^7(x-4)^2(x+4)^2$$

A.

C.

B.

D.

E. None of the above.

6. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-4 + 4i \text{ and } 4$$

A. $b \in [0.9, 3.2], c \in [-3, 3], \text{ and } d \in [-18, -14]$

B. $b \in [0.9, 3.2], c \in [-10, -7], \text{ and } d \in [13, 21]$

C. $b \in [-7.8, -3.9], c \in [-3, 3], \text{ and } d \in [121, 134]$

D. $b \in [3.1, 5.5], c \in [-3, 3], \text{ and } d \in [-130, -123]$

E. None of the above.

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7. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-3, \frac{-5}{2}, \text{ and } \frac{-1}{5}$$

A. $a \in [10, 15], b \in [51, 61], c \in [80, 87], \text{ and } d \in [11, 19]$

B. $a \in [10, 15], b \in [-53, -46], c \in [53, 71], \text{ and } d \in [11, 19]$

C. $a \in [10, 15], b \in [-57, -54], c \in [80, 87], \text{ and } d \in [-17, -7]$

D. $a \in [10, 15], b \in [-3, 6], c \in [-81, -75], \text{ and } d \in [-17, -7]$

E. $a \in [10, 15], b \in [51, 61], c \in [80, 87], \text{ and } d \in [-17, -7]$

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8. Which of the following equations *could* be of the graph presented below?
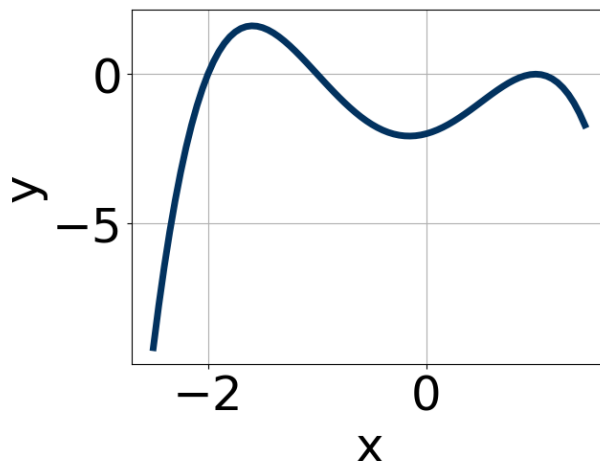
A. $-15(x-1)^8(x+1)^{11}(x+2)^7$

B. $-11(x-1)^8(x+1)^6(x+2)^9$

C. $16(x-1)^8(x+1)^9(x+2)^{11}$

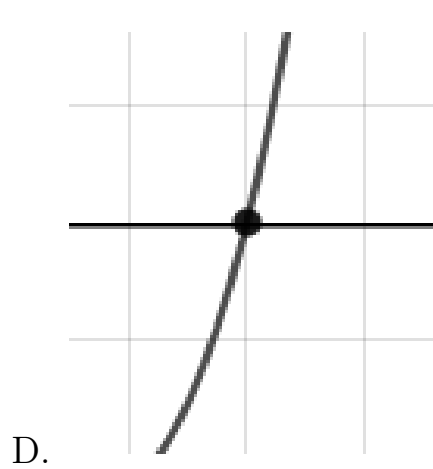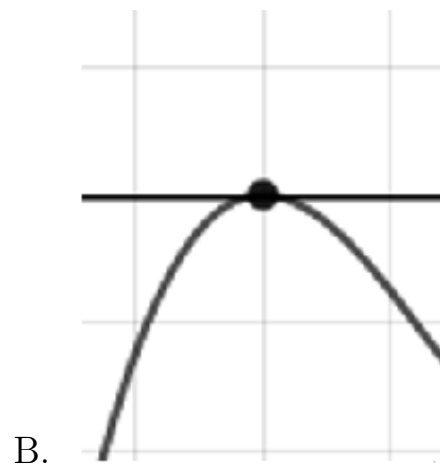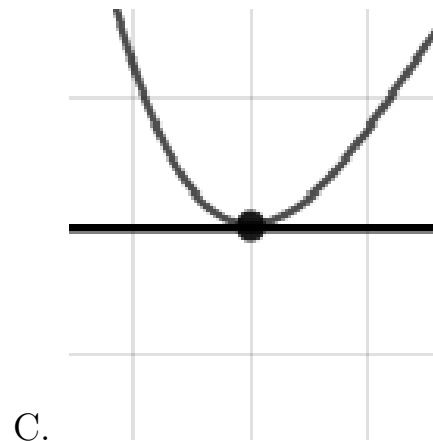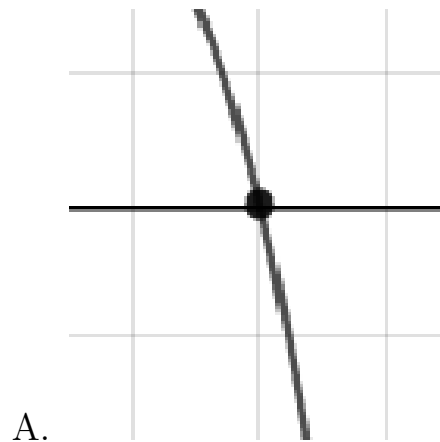D. $-14(x-1)^7(x+1)^8(x+2)^9$

E. $11(x-1)^4(x+1)^{11}(x+2)^4$

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9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 - 4i \text{ and } -2$$

A. $b \in [-1, 5], c \in [1.8, 5.3], \text{ and } d \in [5.8, 6.4]$

B. $b \in [-1, 5], c \in [5.2, 8.8], \text{ and } d \in [7.7, 10.7]$

C. $b \in [4, 9], c \in [35.8, 38.9], \text{ and } d \in [46.8, 52.1]$

D. $b \in [-9, -3], c \in [35.8, 38.9], \text{ and } d \in [-50.4, -49]$

E. None of the above.

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10. Describe the zero behavior of the zero $x = -8$ of the polynomial below.

$$f(x) = -2(x-8)^8(x+8)^{11}(x+9)^9(x-9)^{13}$$

A.

C.

B.

D.

E. None of the above.